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ROBERT W. BECKER & ASSOCIATES  
707 HIGHWAY 66 EAST  
SUITE B  
TIJERAS, NM 87059

EXAMINER

COCKS, JOSIAH C

ART UNIT PAPER NUMBER

3749

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/856,342

Applicant(s)

BRUGGENDICK ET AL.

Examiner

Josiah Cocks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 2/17/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 7-9, 11, 12, 14 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-9, 11, 12, 14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/18/2004 has been entered.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, the recitation of "at least one of a veil of secondary air and a further veil of tertiary air" is unclear. It would not be possible to have solely a "further veil of tertiary air" if a "veil of secondary air" is not present. It is not clear if applicant intends this claim to require simply a veil of secondary air or both a veil of secondary and a veil of tertiary air. For the purpose of an examination on the merits this claim has been regarded as requiring both a veil of secondary air and a veil of tertiary air.

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Claim 12 recites the limitation "said core air" in line 3. There is insufficient antecedent basis for this limitation in the claim. Applicant has not identified a source of core air, only a source of primary air. For the purpose of an examination on the merits this claim has been regarded as reciting that the nitrogen oxide reducing agent is introduced with the primary air.

Correction of these claims is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 7, 11, 12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by *Leikert et al.* (US # 4,790,743).

*Leikert et al.* discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides as described by applicant's claims 7, 11, 12, and 15 including producing a fuel-rich (i.e. sub-stoichiometric) primary flame core from fuel and primary air and adding a nitrogen oxide reducing agent wherein the agent may consist of coal dust (i.e. a hydrocarbon fuel and thus a hydrocarbon as claimed) (see col. 2, lines 44-56). *Leikert et al.* further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Leikert et al.* as applied to claim 7 and further in view of *Beer et al.* (US # 5,411,394).

*Leikert et al.* discloses all the limitations of claims 8 and 9 except possibly a specific recitation of the flame temperature being greater than 1100 °C or for a veil of tertiary air around the flame core.

In regard to claim 8, *Beer et al.* teaches a method of burning nitrogen containing fuel in the same field of endeavor as *Leikert et al.* wherein the method of *Beer et al.* acknowledges that low NO<sub>x</sub> burners using gaseous fuel, coal or fuel oil and forming a fuel-rich flame core having a

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flame core temperature of 1700 K (approximately 1450 °C or greater). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made that the temperature of the flame core of *Leikert et al.* would be greater than 1100 °C or greater as taught by *Beer et al.* as such a temperature range is well known in the art as being desirable for low NOx methods of burning (see *Beer et al.*, col. 3, lines 34-67)

In regard to claim 9, *Beer et al.* teaches a method of burning nitrogen containing fuel in the same field of endeavor as *Leikert et al.* wherein the method of *Beer et al.* includes a veil of tertiary air enveloping the flame core (see col. 8, lines 21-31 and Fig. 2b). Therefore in regard to claim 10, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of *Leikert et al.* to incorporate the tertiary air veil of *Beer et al.* as the use of a tertiary air veil is particularly preferred in further assisting in the reduction of NOx production (see col. 8, lines 14-31).

9. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Leikert et al.* (US # 4,790,743) in view of *Vier et al.* (US # 4,739,713).

*Leikert et al.* discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides substantially as described by applicant's claims 7 and 14 including producing a fuel-rich (i.e. sub-stoichiometric) primary flame core from fuel and primary air and adding a nitrogen oxide reducing agent wherein the agent may consist of coal dust (see col. 2, lines 44-56). *Leikert et al.* further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

In regard to the limitation that the reducing agent is nitrogen, the examiner notes that the title of the *Leikert et al.* patent is "Method of reducing the NO<sub>x</sub>-emissions during combustion of *nitrogen-containing fuels*" (emphasis added). The fuel that is being utilized in *Leikert et al.* is coal dust thus implying that coal dust contains nitrogen and thus the coal dust supplied as a nitrogen oxide reducing agent would qualify as a nitrogen compound as claimed. In further support of this observation, the *Vier et al.* reference is cited. *Vier et al.* teaches a coal-dust fired combustion system in the same field of endeavor as *Leikert et al.*, wherein *Vier et al.* specifically discloses the coal dust is known in the art to include nitrogen which is termed "in-fuel" nitrogen (see *Vier et al.* col. 1, lines 41-45). A person of ordinary skill in the art would therefore recognize that the coal dust of *Leikert et al.*, which functions as a nitrogen oxide reducing agent, would include nitrogen and is a nitrogen compound as claimed.

### ***Response to Arguments***

10. Applicant's arguments filed 2/17/04 have been fully considered but they are not persuasive. Applicant argues that *Leikert* does not disclose supplying a reducing agent that is a nitrogen compound or a hydrocarbon to a flame core. This argument is not persuasive. *Leikert* clearly discloses that fuel, air, and reduction fuel are supplied to form flame zones (7 and 8) (see *Leikert*, Fig. 1). The examiner considers that these flame zones constitute the flame core as recited in applicant's claims. However, even if only flame zone (7) is properly considered the flame core as recited by applicant, the examiner notes that, as shown in Fig. 1 of *Leikert et al.*, the nitrogen reducing agent (i.e. the coal dust) supplied via nozzles (4) contacts the flame zone

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(7) and would therefore be considered to be "supplying" the flame zone (7) with the nitrogen reducing agent as recited in applicant's claims.

Applicant further argues that *Leikert* teaches using a reduction fuel, which is distinct from applicant's reduction agent. However, applicant's claims do not restrict the introduction of a hydrocarbon fuel (such as coal dust) as the reducing agent or a fuel containing "in-fuel nitrogen", which is understood to be contained within the such as the coal dust. The hydrocarbon fuel (i.e. coal dust) of *Leikert* is regarded as the reducing agent claimed by applicant, as this hydrocarbon fuel that contains "in-fuel nitrogen" functions for the same purpose as applicant's reducing agent, i.e. to reduce nitrogen oxide.

### ***Conclusion***

11. This action is made non-final. A THREE month shortened statutory period for reply has been set. Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) months from the mailing date of this communication.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Breen et al. is included to further show the use of hydrocarbons and nitrogen compounds that function to reduce nitrogen oxides.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is




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(703) 305-0450. The examiner can normally be reached on weekdays from 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus, can be reached at (703) 308-1935. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

jcc  
April 6, 2004

  
JOSIAH COCKS  
PATENT EXAMINER  
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